WHAT WILL A GEOLOGIC REPOSITORY BE LIKE?

Purpose:

This lesson will familiarize students with the natural and engineered barriers that will permanently isolate spent nuclear fuel produced by commercial nuclear powerplants and high-level radioactive waste generated by the Nation's defense activities.

Concepts:

1. Spent fuel and high-level waste are potentially hazardous for thousands of years.
2. The disposal system is required to include a system of multiple barriers that will protect the public from exposure to these wastes over a long period of time.
3. The repository will have surface facilities for waste handling and subsurface facilities for waste disposal.

Duration of Lesson:

One 50-minute class period

Objectives:

As a result of participation in this lesson, the learner will be able to:
1. explain ways in which any geologic site can act as part of the multiple barrier system;
2. summarize the three elements that comprise the multiple barrier system; and
3. describe and/or define various aspects of design, construction, and operation plans for the geologic repository.

Skills:

Describing, discussing, explaining, listing, matching, reading, summarizing

Vocabulary:
Accessible environment, alloy, backfill, borehole, borosilicate glass, contamination, corrosion, drift, grout, host rock, hydrologic, polymer, pour canister, shaft, tuff, zeolites, zirconium

Materials:

Reading Lesson
What Will a Geologic Repository Be Like?, p. SR-9

Activity Sheets
What Will a Geologic Repository Be Like?, p. 143

Transparencies
Multiple Barriers, p.137
Rock Strata, p. 139

Videotapes
Fitting the Pieces (12 minutes 45 seconds)
The Science of Yucca Mountain (14 minutes)
(available free of charge from the OCRWM National Information Center, 1-800-225-6972; within Washington, DC, 202-488-6720)

Suggested Procedure:

1. Allow 10 minutes for reading of the lesson entitled *What Will a Geologic Repository Be Like?*

2. Assign the reading review that accompanies this lesson.

3. You may wish to conclude this lesson with a class discussion on what a geologic repository will look like, why the multiple barrier system will be implemented, and how this will be done.

4. Have students write a short paragraph explaining the significance of this lesson.

Teacher Evaluation of Learner Performance:

Completion of reading reviews and participation in class discussion will indicate understanding.

Enrichment:

Working in small groups, students should design a system to warn repository intruders of the future about the location and hazards of the sealed geologic repository.

Additional Enrichment:

Rock Characteristics Important in Repository Siting, pp. SR-27, 181
Porosity and Permeability, pp. 183-189
Solubility, p. 191
Mineral Solubility, p. 195
Thermal Stability, p. 201
Ion Exchange and Zeolites, pp. SR-35, 207
Topographic Map Skills Part 1, pp. SR-37, 211
Topographic Map Skills Part 2, pp. 219-227